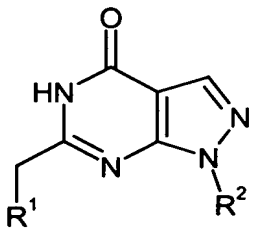
Patent Claims

1. Compounds of the formula



(I),

in which

R^1 is C_1-C_8-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_8-cycloalkyl, where C_1-C_8-alkyl is optionally substituted by oxo, and

where C_1-C_8-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl and C_3-C_8-cycloalkyl are optionally substituted by up to 3 radicals independently of one another selected from the group of C_1-C_6-alkyl, C_1-C_6-alkoxy, hydroxycarbonyl, cyano, amino, nitro, hydroxy, C_1-C_6-alkylamino, halogen, trifluoromethyl, trifluoromethoxy, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl, C_1-C_6-alkylthio,

where

C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio are optionally substituted by one to three radicals independently of one another selected from the group of hydroxy, cyano, halogen, trifluoromethyl, trifluoromethoxy, hydroxycarbonyl and a group of the formula $-NR^3R^4$,

where

R^3 and R^4 are independently of one another hydrogen or C_1-C_6-alkyl,

or

R^3 and R^4 together with the nitrogen atom to which they are bonded are 5- to 8-membered heterocyclyl,

R^2 is phenyl or heteroaryl, where phenyl is substituted by 1 to 3 radicals and heteroaryl is optionally substituted by 1 to 3 radicals in each case independently of one another selected from the group of C_1-C_6-alkyl, C_1-C_6-alkoxy, hydroxycarbonyl, cyano, trifluoromethyl, trifluoromethoxy, amino, nitro, hydroxy, C_1-C_6-alkylamino, halogen, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio,

where C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio are optionally substituted by one to three radicals independently of one another selected from the group of hydroxy, cyano, halogen, trifluoromethyl, trifluoromethoxy, hydroxycarbonyl and a group of the formula $-NR^3R^4$,

where

R^3 and R^4 have the meanings indicated above,

and the salts, solvates and/or solvates of the salts thereof.

2. Compounds according to Claim 1, where

R^1 is C_1-C_8-alkyl, C_2-C_6-alkenyl, C_2-C_6-alkynyl or C_3-C_8-cycloalkyl, which are optionally substituted by up to 3 radicals independently of one another selected from the group of C_1-C_6-alkyl, C_1-C_6-alkoxy, hydroxycarbonyl, cyano, amino, nitro, hydroxy, C_1-C_6-alkylamino, halogen, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio,

where C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl,

C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio are optionally substituted by a radical selected from the group of hydroxy, cyano, halogen, hydroxycarbonyl and a group of the formula $-NR^3R^4$,

where

R^3 and R^4 are independently of one another hydrogen or C_1-C_6-alkyl,

or

R^3 and R^4 together with the nitrogen atom to which they are bonded are 5- to 8-membered heterocyclyl,

R^2 is phenyl or heteroaryl, where phenyl is substituted by 1 to 3 radicals and heteroaryl is optionally substituted by 1 to 3 radicals in each case independently of one another selected from the group of C_1-C_6-alkyl, C_1-C_6-alkoxy, hydroxycarbonyl, cyano, trifluoromethyl, amino, nitro, hydroxy, C_1-C_6-alkylamino, halogen, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl, C_1-C_6-alkylthio,

where C_1-C_6-alkyl, C_1-C_6-alkoxy, C_1-C_6-alkylamino, C_6-C_{10}-arylcarbonylamino, C_1-C_6-alkylcarbonylamino, C_1-C_6-alkylaminocarbonyl, C_1-C_6-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_6-alkylsulphonylamino, C_1-C_6-alkylsulphonyl and C_1-C_6-alkylthio are optionally substituted by a radical selected from the group of hydroxy, cyano, halogen, hydroxycarbonyl and a group of formula $-NR^3R^4$,

where

R^3 and R^4 have the meanings indicated above,

and the salts, solvates and/or solvates of the salts thereof.

3. Compounds according to Claims 1 and 2, where

R^1 is C_1-C_5-alkyl or C_3-C_6-cycloalkyl, which are optionally substituted by up to 3 radicals independently of one another selected from the group of C_1-C_4-alkyl, C_1-C_4-alkoxy, hydroxycarbonyl, cyano, amino, hydroxy, C_1-C_4-alkylamino, trifluoromethyl, fluorine, chlorine, bromine, C_6-C_{10}-arylcarbonylamino, C_1-C_4-alkylcarbonylamino, C_1-C_4-alkylaminocarbonyl, C_1-C_4-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_4-alkylsulphonylamino, C_1-C_4-alkylsulphonyl, C_1-C_4-alkylthio,

where C_1-C_4-alkyl and C_1-C_4-alkoxy are optionally substituted by a radical selected from the group of hydroxy, cyano, fluorine, chlorine, bromine, hydroxycarbonyl and a group of the formula $-NR^3R^4$,

where

R^3 and R^4 are independently hydrogen or C_1-C_4-alkyl,

or

R^3 and R^4 together with the nitrogen atom to which they are bonded are 5- to 6-membered heterocyclyl,

R^2 is phenyl, pyrimidyl, pyridyl N-oxide or pyridyl, where phenyl is substituted by 1 to 3 radicals and pyrimidyl, pyridyl N-oxide and pyridyl are optionally substituted by 1 to 3 radicals in each case independently of one another selected from the group of C_1-C_4-alkyl, C_1-C_4-alkoxy, hydroxycarbonyl, cyano, trifluoromethyl, amino, hydroxy, C_1-C_4-alkylamino, fluorine, chlorine, bromine, C_6-C_{10}-arylcarbonylamino, C_1-C_4-alkylcarbonylamino, C_1-C_4-alkylaminocarbonyl, C_1-C_4-alkoxycarbonyl, C_6-C_{10}-arylaminocarbonyl, heteroarylaminocarbonyl, heteroarylcarbonylamino, C_1-C_4-alkylsulphonylamino, C_1-C_4-alkylsulphonyl, C_1-C_4-alkylthio,

where C_1-C_4-alkyl and C_1-C_4-alkoxy are optionally substituted by a radical selected from the group of hydroxy, cyano, fluorine, chlorine, bromine, hydroxycarbonyl and a group of the formula $-NR^3R^4$,

where

R^3 and R^4 have the meanings indicated in Claim 1,

and the salts, solvates and/or solvates of the salts thereof.

4. Compounds according to Claims 1 to 3, where R^1 has the meanings indicated in Claims 1 to 3, and

R^2 is phenyl, pyridyl N-oxide or pyridyl, where phenyl is substituted by 1 to 3 radicals and pyridyl and pyridyl N-oxide are optionally substituted by 1 to 3 radicals in each case independently of one another selected from the group of methyl, ethyl, 2-propyl, trifluoromethyl, methoxy, ethoxy, fluorine and chlorine,

and the salts, solvates and/or solvates of the salts thereof.

5. Compounds according to Claims 1 to 4, where

R^1 is C_1-C_5-alkyl or C_5-C_6-cycloalkyl, which are optionally substituted by up to 3 radicals independently of one another selected from the group of C_1-C_4-alkyl, trifluoromethyl, fluorine, hydroxy, phenylcarbonylamino, C_1-C_4-alkylcarbonyl-amino, C_1-C_4-alkylaminocarbonyl or phenylaminocarbonyl, and

R^2 is phenyl, pyridyl N-oxide or pyridyl, where phenyl is substituted by 1 to 3 radicals and pyridyl and pyridyl N-oxide are optionally substituted by 1 to 3 radicals in each case independently of one another selected from the group of methyl, ethyl, 2-propyl, trifluoromethyl, methoxy, ethoxy, fluorine and chlorine,

and the salts, solvates and/or solvates of the salts thereof.

6. Compounds according to Claims 1 to 5, where

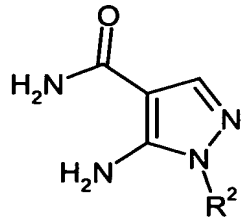
R^1 is C_1-C_5-alkyl or C_5-C_6-cycloalkyl, which are optionally substituted by up to 3 radicals independently of one another selected from the group of C_1-C_4-alkyl, fluorine, trifluoromethyl, hydroxy, phenylcarbonylamino, C_1-C_4-alkylcarbonyl-amino, C_1-C_4-alkylaminocarbonyl or phenylaminocarbonyl, and

R^2 is phenyl, pyridyl N-oxide or pyridyl, where phenyl is substituted by one radical and pyridyl and pyridyl N-oxide are optionally substituted by one radical in each case independently of one another selected from the group of methyl, ethyl, 2-propyl, trifluoromethyl, methoxy, ethoxy, fluorine and chlorine,

and the salts, solvates and/or solvates of the salts thereof.

7. Process for preparing compounds according to Claim 1, characterized in that

[A] compounds of the formula

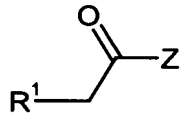


(II),

in which

R^2 has the meanings indicated in Claim 1,

are converted by reaction with a compound of the formula



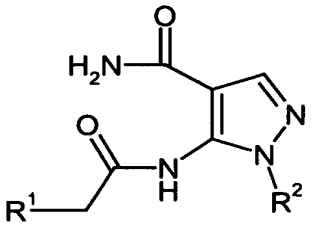
(IIIa),

in which R^1 has the meanings indicated in Claim 1,

and

Z is chlorine or bromine,

in an inert solvent and in the presence of a base, initially into compounds of the formula



(IV),

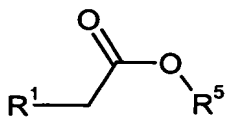
in which

R^1 and R^2 have the meanings indicated in Claim 1,

and then cyclized in an inert solvent in the presence of a base to compounds of the formula (I),

or

[B] compounds of the formula (II) are reacted with a compound of the formula


(IIIb),

in which

R^1 has the meanings indicated in Claim 1,

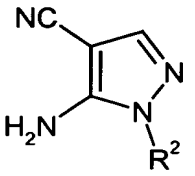
and

R^5 is methyl or ethyl,

in an inert solvent and in the presence of a base, with direct cyclization to (I),

or

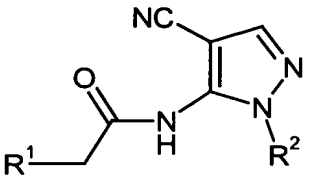
[C] compounds of the formula


(V),

in which

R^2 has the meanings indicated in Claim 1,

are converted initially by reaction with a compound of the formula (IIIa) in an inert solvent and in the presence of a base into compounds of the formula


(VI),

in which

R^1 and R^2 have the meanings indicated in Claim 1,

and the latter are cyclized in a second step in an inert solvent and in the presence of a base and of an oxidizing agent to (I),

and the resulting compounds of the formula (I) are where appropriate reacted with the appropriate (i) solvents and/or (ii) bases or acids to give their solvates, salts and/or solvates of the salts.

8. Compounds according to any of Claims 1 to 6 for the treatment and/or prophylaxis of diseases.

9. Medicament comprising at least one of the compounds according to any of Claims 1 to 6 and at least one pharmaceutically acceptable, essentially non-toxic carrier or excipient.

10. Use of the compounds according to any of Claims 1 to 6 for producing a medicament for the prophylaxis and/or treatment of impairments of perception, concentration, learning and/or memory.

11. Use according to Claim 10, where the impairment is a consequence of Alzheimer's disease.

12. Use of the compounds according to any of Claims 1 to 6 for producing a medicament for improving perception, concentration, learning and/or memory.

13. Method for controlling impairments of perception, concentration, learning and/or memory in humans or animals by administering an effective amount of compounds from Claims 1 to 6.

14. Method according to Claim 13, where the impairment is a consequence of Alzheimer's disease.